



# Operating Instructions

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## 1. SAFETY REGULATIONS AND INFORMATION

Read these operating instructions carefully before starting work on the device. Observe the following warnings to prevent malfunctions or danger to persons.

These operating instructions are to be regarded as part of the device. The device is only to be sold or passed on together with the operating instructions.

These operating instructions may be duplicated and distributed to inform about potential dangers and their prevention.

### 1.1 Hazard levels for warnings

These operating instructions use the following hazard levels to indicate potentially hazardous situations and important safety regulations:



#### DANGER

Indicates an imminently hazardous situation which will result in death or serious injury if the specified actions are not taken. Compliance with the instructions is imperative.

#### WARNING

Indicates a potentially hazardous situation which can result in death or serious injury if the specified actions are not taken. Exercise extreme caution while working.

#### CAUTION

Indicates a potentially hazardous situation which can result in minor or moderate injury or damage to property if the specified actions are not taken.

#### NOTE

A potentially harmful situation can occur and, if not avoided, can lead to property damage.



# Operating Instructions

## 1.2 Staff qualifications

The device may only be transported, unpacked, installed, operated, maintained and otherwise used by suitably qualified, trained and authorised staff.

Only authorised specialists are permitted to install the device, to carry out a test run and to perform work on the electrical installation.

## 1.3 Basic safety rules

The safety hazards associated with the device must be assessed again following installation in the final product. The locally applicable industrial safety regulations are always to be observed when working on the device. Keep the workplace clean and tidy. Untidiness in the work area increases the risk of accidents.

Note the following when working on the device:

- Do not perform any modifications, additions or conversions on the device without the approval of ebm-papst A&NZ.

## 1.4 Voltage

- Check the device's electrical equipment at regular intervals; see chapter 7.2 Safety inspection.
- Replace loose connections and defective cables immediately.

### DANGER

#### Electrically charged device

Risk of electric shock

- When working on an electrically charged device, stand on a rubber mat.

### WARNING

#### Live terminals and connections even with device switched off

Electric shock

- Wait five minutes after disconnecting the voltage at all poles before opening the device.

### CAUTION

#### In the event of fault, the rotor and the impeller will be energised

The rotor and impeller have basic insulation.

- Do not touch the rotor and impeller once installed.

### CAUTION

#### If control voltage or a stored speed set value is applied, the motor will restart automatically, e.g. after a power failure.

Risk of injury

- Keep out of the device danger zone. When working on the device, switch off the line voltage and ensure that it cannot be switched back on.
- Wait until the device comes to a stop.
- After working on the device, remove any tools or other objects from the device.

## 1.5 Safety and protective features



### DANGER

#### Protective device missing and protective device not functioning

Without a protective device there is a risk of serious injury, for instance if the hands reach or are sucked into the device during operation.

- Operate the device only with a fixed protective device and guard grille.
- The fixed protective device must be able to withstand the kinetic energy of a fan blade that becomes detached at maximum speed. There must not be any gaps which it is possible to reach into with the fingers, for example.
- The device is a built-in component. As the operator, you are responsible for ensuring that the device is secured adequately.
- Stop the device immediately if you notice a missing or ineffective protective device.

### CAUTION

#### Edges on exposed surfaces

- The device is made of sheet metal housings and as a result the edges can be sharp. Ensure you are safe from sharp edges, during install and after install.

## 1.6 Electromagnetic radiation

Interference from electromagnetic radiation is possible, e.g. in conjunction with open and closed-loop control devices.

If impermissible radiation levels occur following installation, appropriate shielding measures have to be taken by the user.

### NOTE

#### Electrical or electromagnetic interferences after installing the device in customer equipment.

- Verify that the entire setup is EMC-compliant.

## 1.7 Mechanical movement



### DANGER

#### Rotating device

Risk of injury to body parts coming into contact with the rotor or impeller.

- Secure the device against accidental contact.
- Before working on the system/machine, wait until all parts have come to a standstill.



### DANGER

#### Ejected parts

Missing protective devices may cause balancing weights or broken fan blades to be ejected and cause injury.

- Take appropriate safety measures.

### WARNING

#### Rotating device

Long hair and dangling items of clothing, jewellery and the like can become entangled and be pulled into the device. Injuries can result.

- Do not wear any loose-fitting or dangling clothing or jewellery while working on rotating parts.
- Protect long hair with a cap.



# Operating Instructions

## 1.8 Emissions

### WARNING

Depending on the installation and operating conditions, the sound pressure level may exceed 70 dB (A).

Risk of noise-induced hearing loss

- Take appropriate technical safety measures.
- Protect operating personnel with appropriate safety equipment such as hearing protection.
- Also observe the requirements of local agencies.

## 1.9 Hot surface



### CAUTION

High temperature on electronics housing

Risk of burns

- Ensure sufficient protection against accidental contact.

## 1.10 Transport

### WARNING

Transporting the fan

Injuries from tipping or slipping

- Wear safety shoes and cut-resistant safety gloves. The fan is only to be transported in its original packing. The fan is to be transported lying flat, i.e. the motor axis must be vertical. Secure the fan(s) e.g. with a lashing strip to stop anything slipping or tipping.

## 1.11 Storage

- Store the device, partially or fully assembled, in a dry and weatherproof manner in the original packaging in a clean environment.
- Protect the device against environmental effects and dirt until the final installation.
- We recommend storing the device for no longer than one year in order to guarantee trouble-free operation and the longest possible service life.
- Even devices explicitly intended for outdoor use are to be stored as described prior to commissioning.
- Maintain the storage temperature; see chapter 3.5 Transport and storage conditions.
- Make sure that all screwed cable glands are fitted with dummy plugs.

## 1.12 Disposal

Comply with all relevant local requirements and regulations when disposing of the device.

## 2. INTENDED USE

The device is exclusively designed as a built-in device for moving air according to its technical data.

Any other usage above and beyond this does not conform with the intended purpose and constitutes misuse of the device.

Customer equipment must be capable of withstanding the mechanical and thermal stresses that can arise from this product. This applies for the entire service life of the equipment in which this product is installed.

### Intended use also includes

- Using the device only in power systems with grounded neutral (TN/TT power systems).
- The device is to be used in networks with network quality characteristics as per EN 50160.
- Using the device only in stationary systems.
- Performing all maintenance work.
- Conveying air at ambient air pressure between 800 mbar and 1050 mbar.
- Using the device within the permitted ambient temperature range, see chapter 3.5 Transport and storage conditions and chapter 3.2 Nominal data.
- Operating the device with all protective devices.
- Following the operating instructions.

### Improper use

In particular, operating the device in the following ways is prohibited and could be hazardous:

- Operating the device in an imbalanced state, e.g. due to dirt deposits or ice formation.
- Resonant operation, operation with severe vibration. This also includes vibration transmitted to the device from the customer installation.
- Operation in medical equipment with a life-sustaining or life-supporting function.
- Operation with external vibrations.
- Conveying solids in the flow medium.
- Painting the device.
- Connections (e.g. screws) coming loose during operation.
- Opening the terminal box during operation.
- Conveying air that contains abrasive particles.
- Conveying highly corrosive air, e.g. salt spray. Exceptions: devices designed for salt spray and correspondingly protected.
- Operating the device close to flammable materials or components.
- Operating the device in an explosive atmosphere.
- Using the device as a safety component or to perform safety related functions.
- Operation with completely or partially disassembled or manipulated protective devices.
- In addition, all application not listed among intended uses.



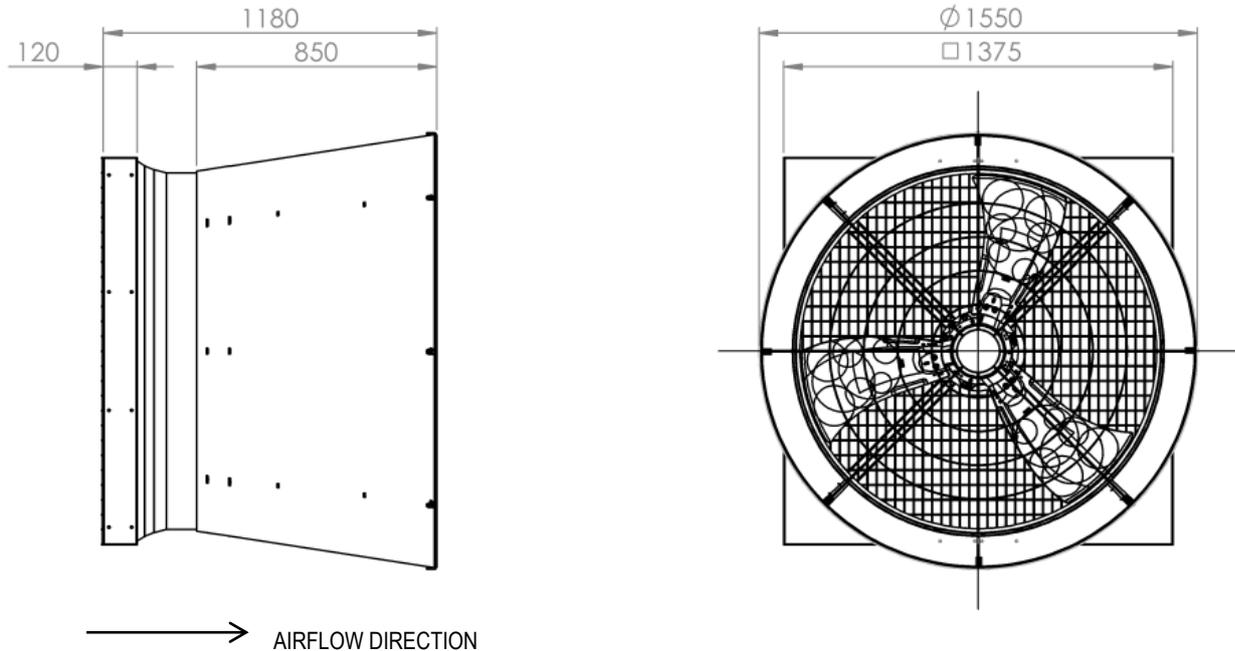
AF1250-003  
AFFB1250-01

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# Operating Instructions

## 3. TECHNICAL DATA

### 3.1 Product drawing



P/N AF1250-001 (as shown)

P/N AFFB1250-00 (is replacement stock for AF1250-001, it is the fan and bracket only)

**All dimensions are in mm**

**Direction of air flow "A"**

#### Fan cable requirement

Power supply and control cable diameter: min. 4 mm, max 10 mm, tightening torque for cable gland  $4 \pm 0.6$  Nm.

#### Fan junction box requirements

Tightening torque  $3.5 \pm 0.5$  Nm.



# Operating Instructions

## 3.2 Nominal data

|                             |            |
|-----------------------------|------------|
| Motor                       | M3G150-NA  |
| Phase                       | 3~         |
| Nominal Voltage / VAC       | 400        |
| Nominal voltage range / VAC | 380 .. 480 |
| Frequency / Hz              | 50/60      |

|                               |              |
|-------------------------------|--------------|
| Method of obtaining data      | maximum load |
| Speed / min <sup>-1</sup>     | 548          |
| Power consumption / W         | 1800         |
| Current draw / A              | 2.6          |
| Max. Back pressure / Pa       | 78           |
| Min. ambient temperature / °C | -25          |
| Max. ambient temperature / °C | 65           |

Subject to change

## 3.3 Technical description

|   |  |
|---|--|
| Mass  | 118 kg   |
| Size  | 1250 mm / 50 inches  |
| Rotor surface                                     | Painted black  |
| Electronics housing material                      | Die-cast aluminium, painted black  |
| Blade material                                    | Die-cast aluminium, painted black  |
| Housing material                                  | Galvanised steel   |
| Guard grille material                             | Steel phosphate  |
| Number of blades                                  | 3  |
| Blade pitch                                       | 0°   |
| Airflow direction                                 | "A"  |
| Direction of rotation                             | Counter clockwise, viewed toward rotor   |
| Degree of protection                              | IP 55  |
| Insulation class                                  | "F"  |
| Moisture (F) / Environmental (H) protection class | H2+C   |
| Installation position                             | Shaft horizontal or rotor on top   |
| Condensate drainage holes                         | On stator side   |
| Mode  | S1   |
| Motor bearing                                     | Ball bearing   |
| Technical features                                | <ul style="list-style-type: none"> <li>- Output 10 VDC, max. 10 mA</li> <li>- Output 20 VDC, max. 50 mA</li> <li>- Output for slave 0-10 V</li> <li>- Input for sensor 0-10 V or 4-20 mA</li> <li>- External 24V input (parameter setting)</li> <li>- External release input</li> <li>- Alarm relay</li> <li>- Integrated PID controller</li> <li>- Power limiter</li> <li>- Motor current limitation</li> <li>- PFC, passive</li> <li>- RS-485 MODBUS-RTU</li> <li>- Soft start</li> <li>- EEPROM write cycles: 100,000 maximum</li> <li>- Control input 0-10 VDC/PWM</li> <li>- Control interface with SELV</li> </ul> |

|  |   |
|--|---|
|  | <p>potential safely disconnected from the mains</p> <ul style="list-style-type: none"> <li>- Thermal overload protection for electronics/motor</li> <li>- Line under voltage / phase failure detection</li> </ul> |
| Touch current according to IEC 60990 (measuring circuit Fig. 4, TN system) | <= 3.5 mA   |
| Electrical hook-up   | Via terminal box  |
| Motor protection   | Reverse polarity and locked-rotor protection  |
| Protection class   | I (with customer connection of protective earth)  |
| Conformity with standards  | EN 61800-5-1, CE  |



|          |  |
|----------|--|
| Approval | EAC; UL 1004-7 + 60730-1; CSA C22.2 No.77 + CAN/CSA-E60730-1 |
|----------|--|

With regard to cyclic speed loads, note that the rotating parts of the device are designed for a maximum of one million load cycles. If you have specific questions, consult ebm-papst A&NZ for support.

→ Use the device in accordance with its degree of protection.

## Information on surface quality

The surfaces of the products conform to the generally applicable industrial standard. The surface quality may change during the production period. This has no effect on strength, dimensional stability and dimensional accuracy. The colour pigments in the paints used perceptibly react to UV light over the course of time. This does not however in any way affect the technical properties of the products. The product is to be protected against UV radiation to prevent the formation of patches and fading. Changes in colour are not a reason for complaint and are not covered by the warranty.

## 3.4 Mounting data

→ Secure the screws against unintentional loosening (e.g. use self-locking screws).

Any further mounting data required can be taken from the product drawing.

## 3.5 Transport and storage conditions

→ Use the device in accordance with its degree of protection.

|   |         |
|---|---------|
| Maximum permissible ambient temperature for motor (transport/storage) | + 80 °C |
| Minimum permissible ambient temperature for motor (transport/storage) | - 40 °C |



# Operating Instructions

## 3.6 Electromagnetic compatibility

|                              |  |
|------------------------------|--|
| EMC immunity to interference | According to EN 61000-6-2 (industrial environment) |
| EMC interference emission    | According to EN 61000-6-4 (industrial environment) |



If several devices are switched in parallel on the supply side so that the line current of the arrangement is in the range of 16 – 75 A, then this arrangement conforms to IEC 61000-3-12 provided that the short-circuit power  $S_{sc}$  at the connection point of the customer system to the public power system is greater than or equal to 120 times the rated output of the arrangement. It is the responsibility of the installation engineer or operator/owner of the device to ensure, if necessary after a consultation with the network operator, that this device is only connected to a connection point with a  $S_{sc}$  value that is greater than or equal to 120 times the rated output of the arrangement.

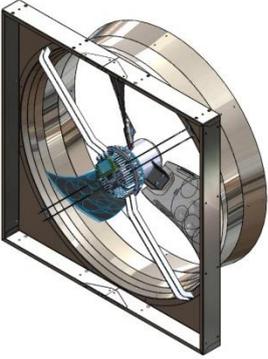
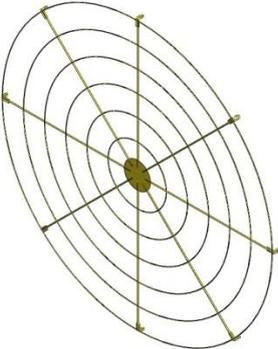


# Operating Instructions

## 4. MECHANICAL INSTALLATION

The unit is not delivered as a complete assembly and requires assembly on site. See assembly instructions below:

### 4.1 List of components

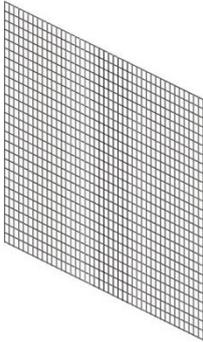
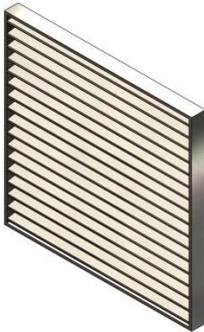
| COMPONENTS        | QTY | IMAGE  |
|-------------------|-----|--|
| FAN               | 1   |    |
| DIFFUSER PANEL    | 4   |  |
| ROUND GUARD GRILL | 1   |  |



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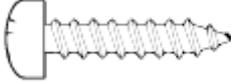
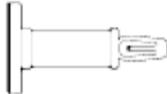
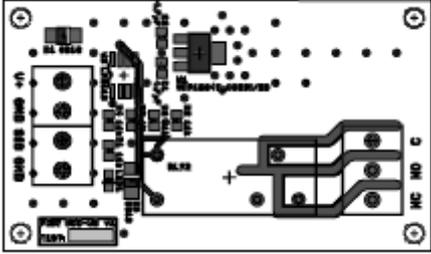
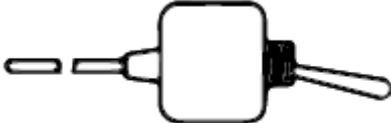
|   |          |  |
|---|----------|--|
| SQUARE GUARD GRILLE                             | 1        |                                      |
| SHUTTER   | 1        |                                    |
| ACTUATOR<br><i>*Depends on package selected</i> | 1        | <br><i>*for illustration only</i> |
| <b>SCREW KIT</b>                                | <b>1</b> |  |
| M6 X 20 SCREW GALVANISED                        | 32       |                                    |
| M6 NUT GALVANISED                               | 4        |                                    |



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# Operating Instructions

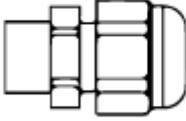
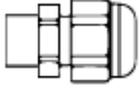
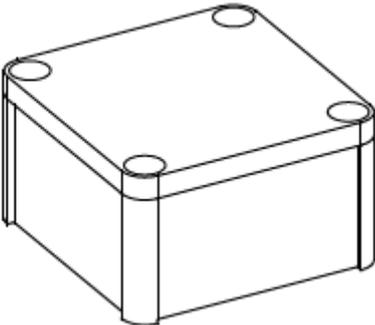
|                                      |          |   |
|--------------------------------------|----------|---|
| M6 WASHER GALVANISED                 | 28       |     |
| M6 NYLON WASHER                      | 16       |    |
| <b>WIRING KIT</b>                    | <b>1</b> |   |
| ACTUATOR SCREW                       | 4        |    |
| JUNCTION BOX SCREW                   | 4        |   |
| ADHESIVE STANDOFF SHUTTER CONTROLLER | 4        |  |
| WAGO CONNECTOR                       | 4        |  |
| CIRCUIT BOARD                        | 1        |   |
| WATERPROOF TOGGLE SWITCH             | 1        |   |



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## Operating Instructions

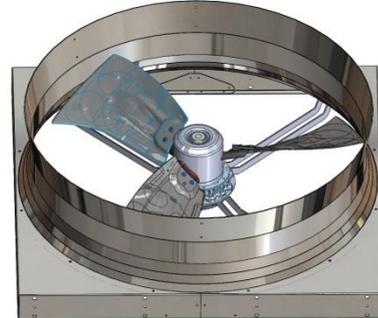
|                        |   |   |
|------------------------|---|---|
| 16MM CABLE GLAND       | 4 |    |
| 12MM CABLE GLAND       | 3 |    |
| JUNCTION BOX           | 1 |    |
| 5 METRE ORANGE CABLE   | 1 |  |
| 5 METRE GREY CABLE     | 1 |  |
| 5 METRE SHIELDED CABLE | 1 |  |



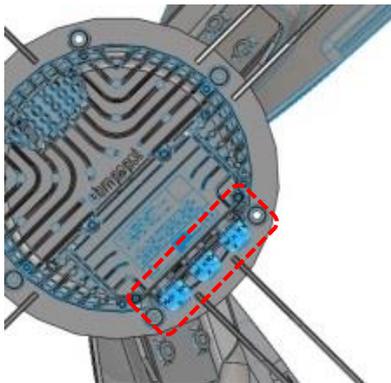
# Operating Instructions

## 4.2 Installation process

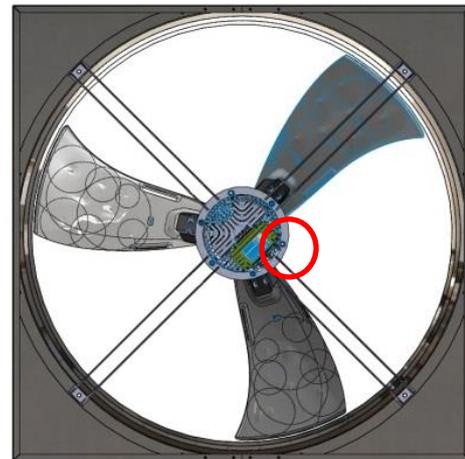
1. Remove a single fan from the pallet.  
**Warning heavy object:** Lift unit in a safe manner



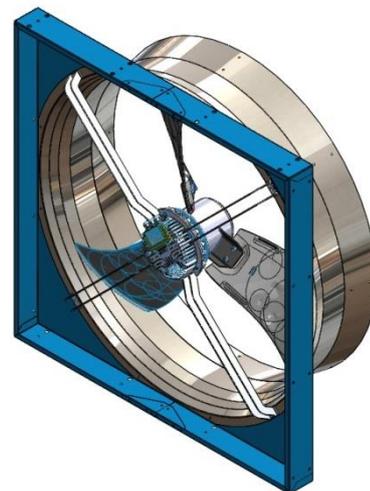
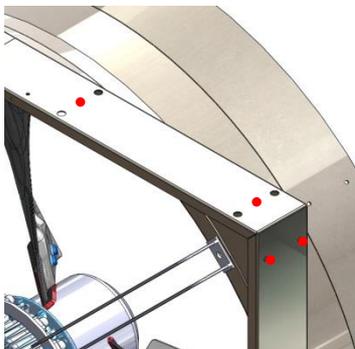
2. Fan will be installed into wall recess.  
**Ensure** the motor oriented towards the shed and the wall ring towards the outside of the shed.  
**Ensure** the cable glands are facing down.  
Utilise bottom and top stickers to ensure correct orientation for drainage purposes.



*Cable glands are highlighted in the figure*



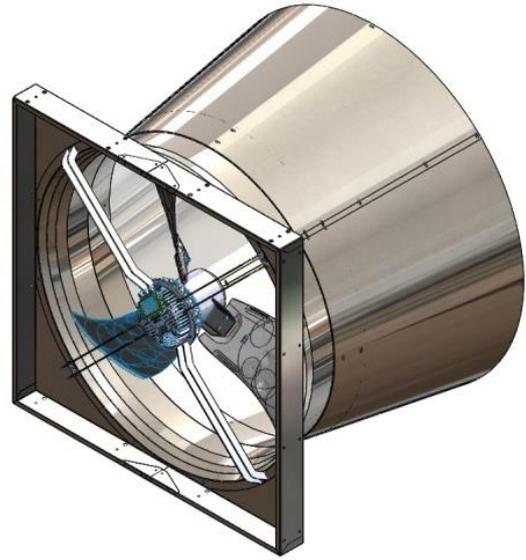
3. Fix the fan securely to the wall to ensure that the fan is stable during operation.  
Utilise holes on square framed wall plate to mount the unit.





## Operating Instructions

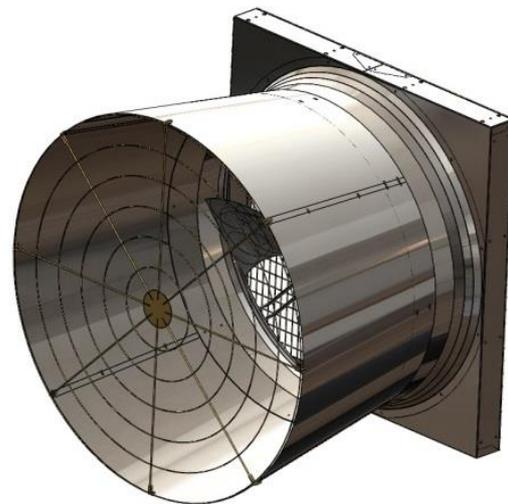
4. Build diffuser.  
**Ensure** rivet nuts sit inside the diffuser. The diffuser sits on the outside of the wall ring. Each diffuser piece has rivet nuts to connect to each other as well as the wall ring.



5. Attach the round guard grille on the end of the diffuser.  
**Warning:** Nylon washers will be required with the stainless steel guard grille to ensure the grille does not come into contact with the diffuser or the bolt.



*Nut, metal washer, diffuser pieces, nylon washer, guard grille, nylon washer and then the bolt.*



6. The wiring instructions can be viewed in the appendix of this document. Wiring of the AF12500-003 consists of three different packages, described in Appendix A, which are denoted below.

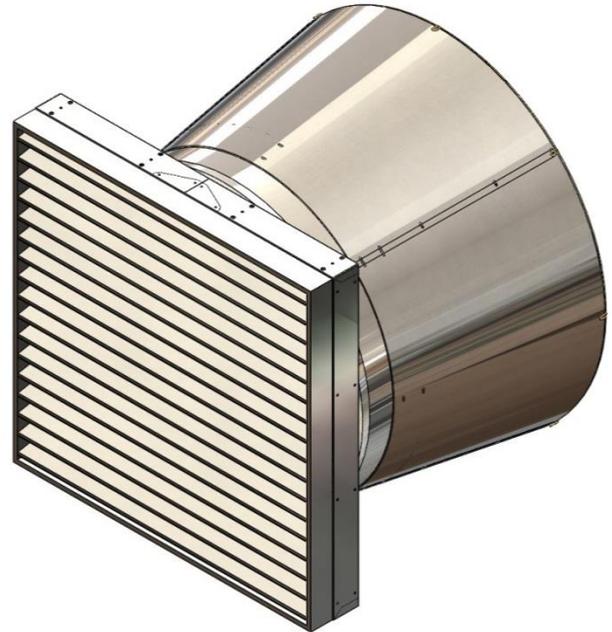
**Warning:** Electrical connection safety described in chapter 5.

1. Standard - on/off operation directly via existing shed environmental controller as for existing belt drive fans.
  - i. With shutter control mechanism, using shutter with an actuator motor (refer to *Appendix B & F*).
  - ii. No shutter control, use of gravity shutter only (refer to *Appendix C & G*).
2. Advanced - 0-10V control directly via existing shed environmental controller using 0-10V analogue outputs from controller.
  - i. With shutter control mechanism, using shutter with an actuator motor (refer to *Appendix B & H*).
  - ii. No shutter control, use of gravity shutter only (refer to *Appendix C & I*).
3. Premium - full AgriCool interface from HMI Electric using MODBUS control for the fans.
  - i. With shutter control mechanism, using shutter with an actuator motor (refer to *Appendix D & J*).
  - ii. No shutter control, use of gravity shutter only (refer to *Appendix E & K*).

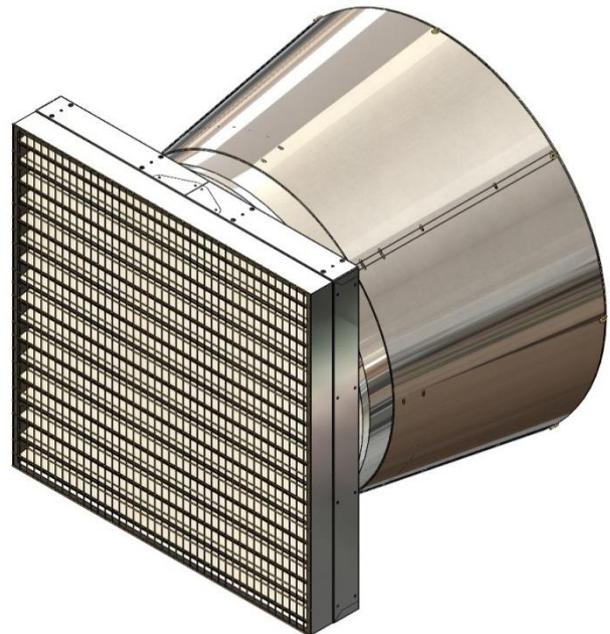


## Operating Instructions

7. **Ensure** that wiring is completed before attempting to attach shutter. Attach shutter to square framed wall plate.
- 7.1. Attach actuator to shutter if motorised shutter is used. Applies to package 1, 2 and 3. For wiring refer to corresponding appendix.



8. Attach square guard grille to shutter side of the fan.



**End of Installation Process**



# Operating Instructions

## 5. CONNECTION AND START-UP

### 5.1 Mechanical connection



**CAUTION**

**Cutting and crushing hazard when removing fan from packaging.**

- Carefully remove the device from its packaging, grasping it by only the housing. Strictly avoid shocks.
- Wear safety shoes and cut-resistant safety gloves.



**CAUTION**

**Heavy load when unpacking device**

Risk of physical injury, such as back injuries.

- Use suitable hoisting equipment to remove the device from its packaging.

**CAUTION**

**The blades of the impeller could be damaged.**

- Carefully set down the fan on a soft surface. Make sure the blades are not subjected to load. Following installation, make sure the impeller moves easily and that the blades of the impeller are not deformed or bent and do not catch at any point.

**NOTE**

**Damage to the device from vibration**

Bearing damage, shorter service life

- The device must not be subjected to force or excessive vibration from sections of the installation. i.e. If the fan is connected to air ducts, the connection should be isolated from vibration to ensure stress-free attachment of the fan to the substructure.
- Severe vibration can arise for instance from poor handling, transportation damage and the resultant imbalance.

- Check the device for transport damage. Damaged devices are not to be installed.
- Install the undamaged device accordance with your application.



**CAUTION**

**Possible damage to the device**

If the device slips during installation, serious damage can result.

- Ensure that the device is securely positioned at its place of installation until all fastening screws have been tightened.

- The fan must not be strained on fastening

### 5.2 Electrical connection



**DANGER**

**Voltage on the device**

Electric shock

- Always connect a protective earth first.
- Check the protective earth.



**DANGER**

**Faulty insulation**

Risk of fatal injury from electric shock

- Use only cables that meet the specified installation regulations for voltage, current, insulation material, capacity, etc.
- Route cables so that they cannot be touched by any rotating parts.



**DANGER**

**Electrical charge (>50 µC) between phase conductors and protective earth connection after switching off supply with multiple devices connected in parallel.**

Electric shock, risk of injury

- Ensure sufficient protection against accidental contact. Before working on the electrical hook up, short the supply and PE connections.

**CAUTION**

**Voltage**

The fan is a built-in component and has no disconnecting switch.

- Only connect the fan to circuits that can be switched off with an all-pole disconnection switch.
- When working on the fan, secure the system/machine in which the fan is installed so as to prevent it from being switched back on.

**NOTE**

**Device malfunctions possible**

Route the device's control lines separately from the supply line.

- Maintain the greatest possible clearance. Recommendation: clearance > 10 cm (separate cable routing)

**NOTE**

**Water ingress into wires or cables**

Water ingress at the customer end of the cable can damage the device.

- Make sure the end of the cable is connected in a dry environment.



Only connect the device to circuits that can be switched off with an all-pole disconnection switch.

#### 5.2.1 Requirements

- Check whether the data on the nameplate match the connection data.
- Before connecting the device, make sure the power supply matches the device voltage.
- Only use cables designed for the current level indicated on the nameplate. For determining the cross-section, note the sizing criteria according to EN 61800-5-1. The protective earth must have a cross-section equal to or greater than that of the phase conductor.

We recommend the use of 105°C cables. Ensure that the minimum cable cross-section is at least AWG26/0.13 mm².



# Operating Instructions

## Ground conductor contact resistance according to EN 61800-5-1

Compliance with the impedance specifications according to EN 61800-5-1 for the protective earth connection circuit must be verified in the end application.

Depending on the circumstances of installation, it may be necessary to connect an additional protective earthing conductor to the extra protective earth terminal on the device.

The protective earth terminal is on the housing and has a ground conductor symbol and a bore hole.

## 5.2.2 Supply connection and fuses

Assignment of supply cable cross-sections and their required fuses (line protection only, no equipment protection).

| Nominal voltage           | Fuse |      | Automatic circuit breaker | Cable cross-section<br>mm <sup>2</sup> | Cable cross-section<br>*AWG |
|---------------------------|------|------|---------------------------|--|-----------------------------|
|                           | VDE  | UL   |                           |  |                             |
| 3/PE AC<br>380-480<br>VAC | 16 A | 15 A | C16A                      | 1.5                                    | 16                          |
| 3/PE AC<br>380-480<br>VAC | 20 A | 20 A | C20A                      | 2.5                                    | 14                          |
| 3/PE AC<br>380-480<br>VAC | 25 A | 25 A | C25A                      | 4.0                                    | 12                          |

## 5.2.3 Reactive current



Because of the EMC filter integrated for compliance with EMC limits (interference emission and immunity to interference), reactive currents can be measured in the supply line even when the motor is at a standstill and the line voltage is switched on.

- The values are typically less than 250 mA.
- At the same time, the effective power in this operating state (operational readiness) is typically < 5 W.

## 5.2.4 Residual current circuit breaker (RCCB)



Only universal residual current devices (type B or B+) are allowed. As with variable frequency drives, residual current devices cannot provide personal safety while operating the device.

When the device's power supply is switched on, pulsed charging currents from the capacitors in the integrated EMC filter can lead to the residual current devices tripping without delay. We recommend the use of residual current circuit breakers with a trip threshold of 300 mA and delayed tripping (super-resistant, characteristic K).

## 5.2.5 Leakage current



For asymmetrical power systems or if a phase fails, the leakage current can increase to a multiple of the nominal value.

## 5.2.6 Locked-rotor protection



Due to the locked-rotor protection, the starting current (LRA) is equal to or less than the nominal current (FLA).

## 5.3 Connection in terminal box

### 5.3.1 Preparing cables for connection

Only strip the cable as far as necessary, ensuring that the cable gland is sealed and there is no strain on the connections. For tightening torque, see chapter 3.1 Product drawing.

#### NOTE

Tightness and strain relief are dependent on the cable used.

→ This must be checked by the user.

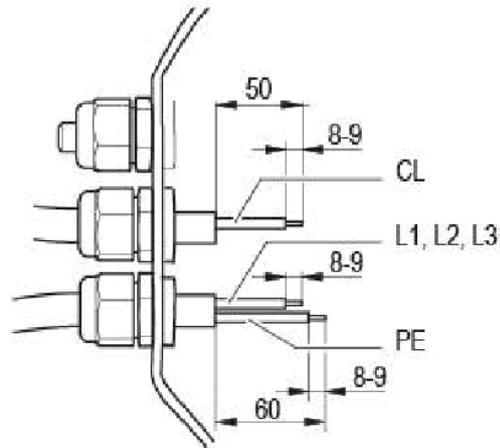


Fig. 1: Recommended stripping lengths in mm (inside terminal box)  
Legend: CL = control lines.



# Operating Instructions

## 5.3.2 Connecting wires to terminals

**WARNING**

**Live terminals and connections even with device switched off**

Electric shock

→ Wait five minutes after disconnecting the voltage at all poles before opening the device.

- Remove the cap from the cable gland. Only remove caps where cables are fed in.
- Equip the cable glands with the seals inserts provided in the terminal box.
- Route the wire(s) (not included in the scope of delivery) into the terminal box.
- First connect the "PE" (protective earth).
- Connect the wires to the corresponding terminals. Use a screwdriver to do so.
- When connecting, ensure that no wire ends fan out.
- Seal the terminal box.

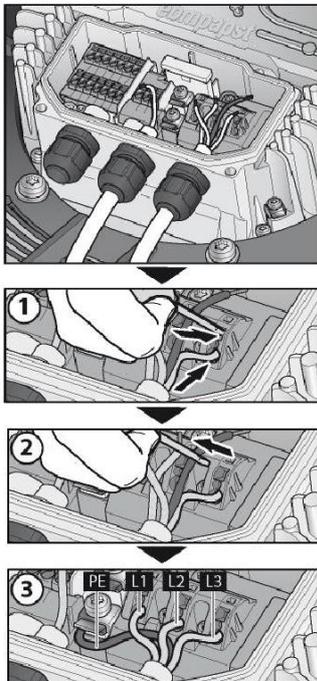


Fig. 2: Connecting the wires to terminals

## 5.3.3 Cable routing

Water must be prevented from reaching the cable gland along the cable.

**NOTE**

**Damage caused by moisture penetration.**

Moisture can penetrate into the terminal box if water is constantly present at the cable glands.

→ To prevent the constant accumulation of water at the cable glands, the cable should be routed in a U-shaped loop wherever possible. If this is not possible, a drip edge can be produced by fitting a cable tie directly in front of the cable gland for example.

### Fans installed upright

When routing the cable, make sure that the cable glands are located at the bottom. The cables must always be routed downwards.

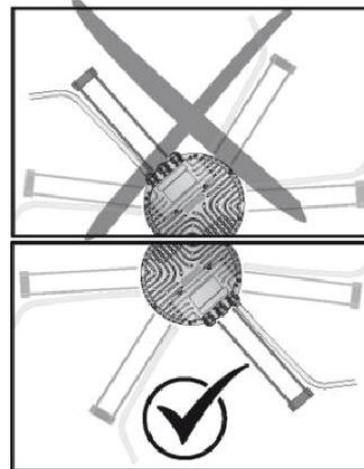


Fig. 3: Cable routing for fans installed upright.

## 5.4 Factory settings

Factory settings made for the device by ebm-papst.

|                                     |                    |
|-------------------------------------|--------------------|
| Motor parameter set 1               | PWM controlling    |
| Motor parameter set 2               | PWM controlling    |
| Fan / device address                | 1                  |
| Max. PWM / %                        | 100                |
| Min. PWM / %                        | 5                  |
| Save set value to EEPROM            | Yes                |
| Set value requirement               | Analogue (linear)  |
| Direction of action parameter set 1 | Positive (heating) |
| Direction of action parameter set 2 | Positive (heating) |





# Operating Instructions

## 5.6 Checking connections

- Ensure isolation from supply (all phases).
- Make sure a restart is impossible.
- Check the cables for proper fit.
- Screw the terminal box cover back on again. Terminal box tightening torque, see chapter 3.1 Product drawing.
- Route the cables in the terminal box so that the terminal box cover closes without resistance.
- Use all plug screws. Insert the screws by hand to avoid damage to the threads.
- Make sure that the terminal box is completely closed and sealed and that all screws and cable glands have been properly tightened.

## 5.7 Switching on the device

The device may only be switched on if it has been installed properly and in accordance with its intended use, including the required safety mechanisms and professional electrical connections. This also applies for devices which have already been equipped with plugs and terminals or similar connectors by the customer.



**WARNING**  
**Hot motor housing**  
Risk of fire

- Ensure that no combustible or flammable materials are located close to the fan.



**NOTE**  
**Damage to the device from vibration**  
Bearing damage, shorter service life

- Low-vibration operation of the device must be ensured over the entire speed control range.
- Severe vibration can be caused by component or structural resonance.
- Speed ranges with excessively high vibration levels and possible resonant frequencies must be determined in the course of fan commissioning. Either run through the resonant ranges as quickly as possible with speed control or find another remedy. Operation with excessively high vibration levels can lead to premature failure.
- Before switching on, check the device for visible external damage and make sure the protective devices are functional.
- Check the fan's air flow paths for foreign matter and remove any foreign matter found.
- Apply the nominal supply voltage.
- Start the device by changing the input signal.

## 5.8 Switching off the device

Switching off the device during operation:

- Switch off the device via the control input.
- Do not switch the motor (e.g. in cyclic operation) on and off via power supply.

Switching off the device for maintenance:

- Switch off the device via the control input.
- Do not switch the motor (e.g. in cyclic operation) on and off via power supply.
- Disconnect the device from the power supply.
- When disconnecting, be sure to disconnect the ground connection last.

## 6. INTEGRATED PROTECTIVE FEATURES

The integrated protective functions cause the motor to switch off automatically in the event of the faults described in the table.

| Fault  | Safety features description/function   |
|--|--|
| Rotor position detection error   | An automatic restart follows.  |
| Blocked rotor  | → After the blockage is removed, the motor restarts automatically.   |
| Line under voltage (line voltage outside of permitted nominal voltage range) | → If the line voltage returns to permitted values, the motor restarts automatically.   |
| Phase failure  | A phase of the supply voltage fails for at least 5 s.<br>→ When all phases are correctly supplied again, the motor automatically restarts after 10–40 s. |



# Operating Instructions

## 7. MAINTENANCE, MALFUNCTIONS, POSSIBLE CAUSES AND REMEDIES

Do not perform any repairs on your device. Send the device to ebm-papst A&NZ for repair or replacement.

### WARNING

**Live terminals and connections even with device switched off**

Electric shock

- Wait five minutes after disconnecting the voltage at all poles before opening the device.

### CAUTION

**If control voltage or a stored speed set value is applied, the motor will restart automatically, e.g. after a power failure.**

Risk of injury

- Keep out of the devices danger zone. When working on the device, switch off the line voltage and ensure that it cannot be switched back on.
- Wait until the device comes to a stop.
- After working on the device, remove any tools or other objects from the device.



If the device is out of use for over four months, we recommend switching it on for at least three hours at full speed to allow any condensate to evaporate and to move the bearings.

| Malfunction / fault           | Possible cause   | Possible remedy  |
|-------------------------------|--|--|
| Impeller not running smoothly | Imbalance in rotating parts                                    | Clean the device; replace it if imbalance persists after cleaning. Make sure no weight clips are removed during cleaning.  |
| Motor not turning             | Mechanical blockage  | Switch off, isolate from supply and remove mechanical blockage.  |
|                               | Line voltage faulty  | Check line voltage, restore power supply. Attention! The error message resets automatically. Device restarts automatically without warning.  |
|                               | Faulty connection  | Isolate from supply, correct connection, see connection diagram.   |
|                               | Broken motor winding   | Replace device   |
|                               | Deficient cooling  | Improve cooling. Let the device cool down. To reset the error message, switch off the line voltage for at least 25 s and switch it on again. Alternatively, reset the error message by applying a control signal of <0.5 V to DIN1 or by shorting Din1 to GND.                                 |
|                               | Ambient temperature too high                                   | Reduce the ambient temperature. Let the device cool down. To reset the error message, switch off the mains supply voltage for a min. of 25 s and switch it on again. Alternatively, reset the error message by applying a control signal of <0.5 V to DIN1 or by short circuiting Din1 to GND. |
|                               | Impermissible point of operation (e.g. back pressure too high) | Correct the operating point. Let the device cool down. To reset the error message, switch off the line voltage for at least 25 s and then switch it on again. Alternatively, reset the error message by applying a control signal of <0.5 V to DIN1 or by short Din1 to GND.                   |



If you have any other problems, contact ebm-papst A&NZ



# Operating Instructions

## 7.1 Cleaning

For long life the fan needs to be checked regularly, with particular attention to smooth operation and dust build. Heavy dust build up, especially on the motor housing and the impeller, and/or large vibrations can destroy the fan. In this case, switch off the fan immediately and clean it.

If heavy corrosion is identified on load-bearing or rotating parts of the unit, switch it off immediately and replace it. Repair of load-bearing or rotating parts is not permitted.

The advised cleaning method is a dry clean e.g. with compressed air. If water is needed the suggested method is the use of a traditional water hose. Cleaning with a pressure is possible if the instructions below are strictly obeyed

### NOTE

#### Damage to the device during cleaning

Malfunctions possible

- Do not use acid, alkali or solvent-based cleaning agents.
- Do not disconnect the EC fan from the supply voltage. Switch off via controller (0V)
- Do not use any pointed or sharp-edged objects for cleaning.

#### Instructions for cleaning

Before cleaning with a pressure washer:

- Check if the cable glands are suitably tightened
- Operate the fan for one hour with 100% speed (minimum 80% speed)
- Dried soil needs to be soaked until it softens. If the facility is fitted with a stationary soaking unit, it needs to be ensured that the fans are included. If the fans are not included they need to soak separately, e.g. with the help of a water hose or a backpack sprayer.

During cleaning with pressure washer:

- Only clean the unit when it is stopped; disconnected from the power supply and secure it against restarting.
- Maximum pressure setting of 60-80bar / 870-160 psi and a minimum distance of 0.4m / 1.4 ft must be maintained!
- Only direct water jets at the rotor side, never at the motor side.
- Avoid directing the pressure washer at the condensation drainage hole.
- The water stream has to be oriented in the direction of the motor shaft, vertical to the fan. Never perpendicular to the shaft.



After cleaning agents were used, wash off with fresh water

- Ensure the condensation drainage hole (if present) is not obstructed by dirt.
- If cleaning agents were used, wash off with fresh water
- After cleaning, run the fan for at least 2 hours at maximum speed.
- Confirm the fan is running smoothly, without vibration, by doing a vibration test.
- Adjust maintenance intervals to the level of dust exposure.



# Operating Instructions

## 7.2 Safety inspection

**NOTE**

**High-voltage test**

The integrated EMC filter has Y capacitors. The trigger current is exceeded when AC testing voltage is applied.

- Test the device with DC voltage when you perform the legally required high-voltage test. The voltage to be used corresponds to the peak value of the AC voltage required by the standard.

| What to check?  | How to check?     | How often               | What action?                        |
|---|-------------------|-------------------------|-------------------------------------|
| Contact protection cover for intactness or damage.    | Visual inspection | At least every 6 months | Repair or replacement of the device |
| Device for damage to blades and housing               | Visual inspection | At least every 6 months | Replacement of the device           |
| Fastening the cables                                  | Visual inspection | At least every 6 months | Fasten                              |
| Insulation of cables for damage                       | Visual inspection | At least every 6 months | Replace cables                      |
| Tightness of cable gland                              | Visual inspection | At least every 6 months | Retighten or replace if damaged     |
| Condensate discharge holes for clogging, as necessary | Visual inspection | At least every 6 months | Open holes                          |
| Weld for crack formation                              | Visual inspection | At least every 6 months | Replace device                      |
| Abnormal bearing noise                                | Acoustic          | At least every 6 months | Replace device                      |

## 6.3 Disposal

For ebm-papst, environmental protection and resource preservation are top priority corporate goals. ebm-papst operates an environmental management system which is certified in accordance with ISO 14001 and rigorously implemented around the world on the basis of German standards. Right from the development stage, ecological design, technical safety and health protection are fixed criteria. The following section contains recommendations for ecological disposal of the product and its components.

### 6.3.1 Country-specific legal requirements

**NOTE**

**Country-specific legal requirements**

Always observe the applicable country-specific legal regulations with regard to the disposal of products or waste occurring in the various phases of the life cycle. The corresponding disposal standards are also to be heeded.

### 6.3.2 Disassembly

Disassembly of the product must be performed or supervised by qualified personnel with the appropriate technical knowledge. The product is to be disassembled into suitable components for disposal employing standard procedures for motors.

**WARNING**

**Heavy parts of the product may drop off. Some of the product components are heavy. These components could drop off during disassembly.** This can result in fatal or serious injury and material damage.

- Secure components before unfastening to stop them falling.

### 6.3.3 Component disposal

The products are mostly made of steel, copper, aluminium and plastic. Metallic materials are generally considered to be fully recyclable. Separate the components for recycling into the following categories:

- Steel and iron
- Aluminium
- Non-ferrous metal, e.g. motor windings
- Plastics, particularly with brominated flame retardants, in accordance with marking
- Insulating materials
- Cables and wires
- Electronic scrap, e.g. circuit boards

Only ferrite magnets and not rare earth magnets are used in external rotor motors from ebm-papst Muldingen GmbH & Co. KG.

- Ferrite magnets can be disposed of in the same way as normal iron and steel.

Electrical insulating materials on the product, in cables and wires are made of similar materials and are therefore to be treated in the same manner.

The materials concerned are as follows:

- Miscellaneous insulators used in the terminal box
- Power cables
- Cables for internal wiring
- Electrolytic capacitors

Dispose of electronic components employing the proper procedures for electronic scrap.

- Please contact ebm-papst A&NZ for any other questions on disposal.



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AFFB1250-01



# Operating Instructions

## 8. APPENDIX

### Appendix A – AgriCool kit comparison

| Feature                             | Description  | Conventional Belt Drive Fan* | ebm-papst AgriCool packages |          |         |
|-------------------------------------|--|------------------------------|-----------------------------|----------|---------|
|                                     |  |                              | Standard                    | Advanced | Premium |
| ON / OFF operation                  | Fan running ON (100%) or OFF (0%) only.  | X                            | X                           |          |         |
| Soft start motor                    | No-inrush current reducing stress on the electrical system.  |                              | X                           | X        | X       |
| Staged operation                    | Fan programmed to run at set speeds only.  |                              | X                           | X        | X       |
| Variable speed control              | Infinite speed control allowing for accurate and smooth on demand air flow control.  |                              |                             | X        | X       |
| Speed monitoring                    | Continuous speed (rpm) feedback loop confirming desired fan speed is achieved.   |                              |                             |          | X       |
| Fail-safe-function                  | In case of controller or cable failure the fans can be programmed to run at a set speed to ensure ventilation at all times. (Note: fans can be individually programmed.)                                     |                              |                             |          | X       |
| Redundancy-safety-package           | Control system is always analysing all fans to ensure the air requirement is being delivered. (i.e. If fan A is running at 300 RPM and is turned off or fails, fan B will automatically ramp up to 300 RPM). |                              |                             |          | X       |
| Required airflow vs. actual airflow | Control system is constantly analysing each fan to ensure the required air flow is met at all times.   |                              |                             |          | X       |
| Under ventilation alarm             | If the required air flow is not achieved there will be an alarm (Note: individually programmable for the system).  |                              |                             |          | X       |
| Additional feedback                 | Hours of operation, power usage, airflow logging and error logging.  |                              |                             |          | X       |
| Separate shutter control            | Shutter open/close for increased redundancy (Note: shutters can be controlled individually).   |                              | optional                    | optional | X       |
| Alarm relay                         | Status relay showing fan signal.   |                              | X                           | X        | X       |
| Fault identification                | Communication of all fan faults to AgriCool Interface in control room and/or directly to mobile.   |                              |                             |          | X       |
| Motor protection                    | Internal - phase failure, motor overload, under voltage, over voltage, motor overheat, current limitation.   |                              | X                           | X        | X       |
| Power supply voltage range          | Single phase from 200 Vac to 277 Vac --> ensuring constant performance through voltage fluctuations.   |                              | X                           | X        | X       |
|                                     | Three phase from 380 Vac to 480 Vac --> ensuring constant performance through voltage fluctuations.  |                              | X                           | X        | X       |
| PFC                                 | Power Factor Correction.   |                              | X                           | X        | X       |
| Interference suppression filter     | Reduce the emission of conducted and radiated interference voltages and guarantees immunity to interference in rough industrial environments.  |                              | X                           | X        | X       |



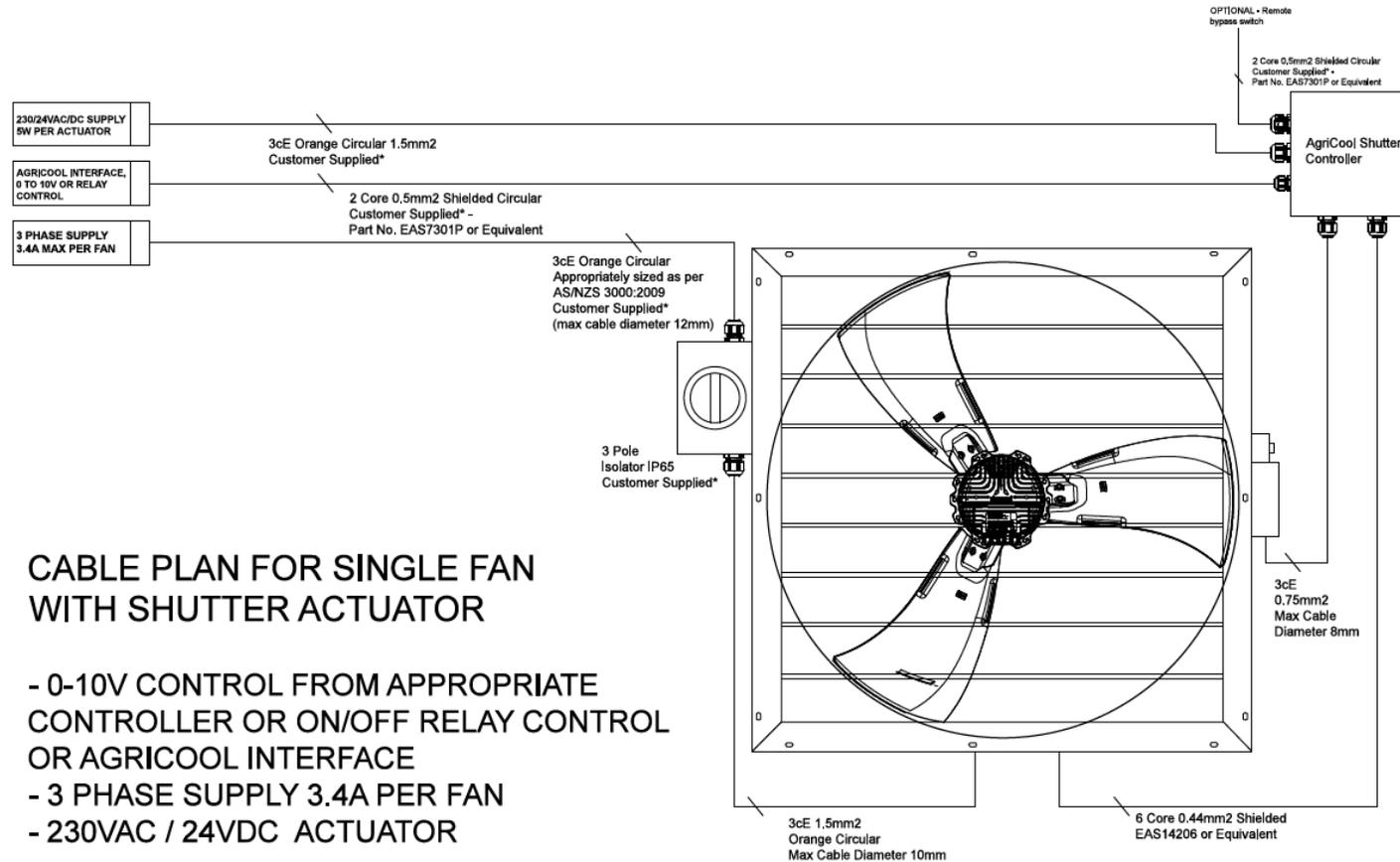
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# Operating Instructions

\*Conventional belt drive fan included in table for reference only.

## Appendix B – Standard/Advanced/Premium Cable Plan Single Fan with Motorised Shutter



### CABLE PLAN FOR SINGLE FAN WITH SHUTTER ACTUATOR

- 0-10V CONTROL FROM APPROPRIATE CONTROLLER OR ON/OFF RELAY CONTROL OR AGRICOOOL INTERFACE
- 3 PHASE SUPPLY 3.4A PER FAN
- 230VAC / 24VDC ACTUATOR

LAYOUT SHOWN AS EXAMPLE ONLY  
CUSTOMER LAYOUT MAY DIFFER BASED ON INDIVIDUAL REQUIREMENTS OR RESTRICTIONS  
\*PLEASE REFER TO RECOMMENDED PRODUCTS LIST FOR CUSTOMER SUPPLIED ITEMS

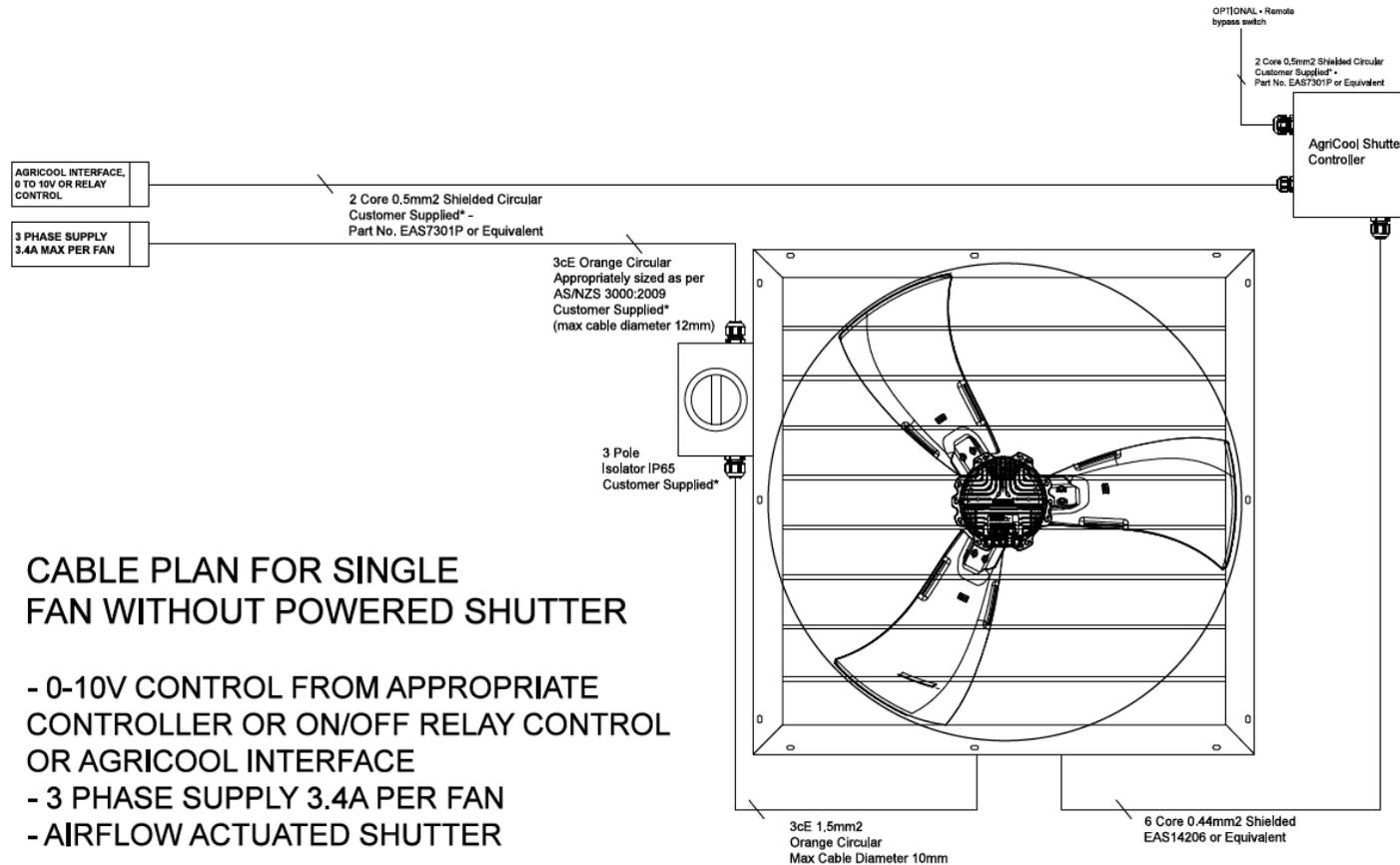


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AFFB1250-01

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# Operating Instructions

## Appendix C – Standard/Advanced/Premium Cable Plan Single Fan with Gravity Fed Shutter



### CABLE PLAN FOR SINGLE FAN WITHOUT POWERED SHUTTER

- 0-10V CONTROL FROM APPROPRIATE CONTROLLER OR ON/OFF RELAY CONTROL OR AGRICOOOL INTERFACE
- 3 PHASE SUPPLY 3.4A PER FAN
- AIRFLOW ACTUATED SHUTTER

LAYOUT IS SHOWN AS AN EXAMPLE ONLY  
CUSTOMER LAYOUT MAY DIFFER BASED ON INDIVIDUAL REQUIREMENTS OR RESTRICTIONS  
\*PLEASE REFER TO RECOMMENDED PRODUCTS LIST FOR CUSTOMER SUPPLIED ITEMS

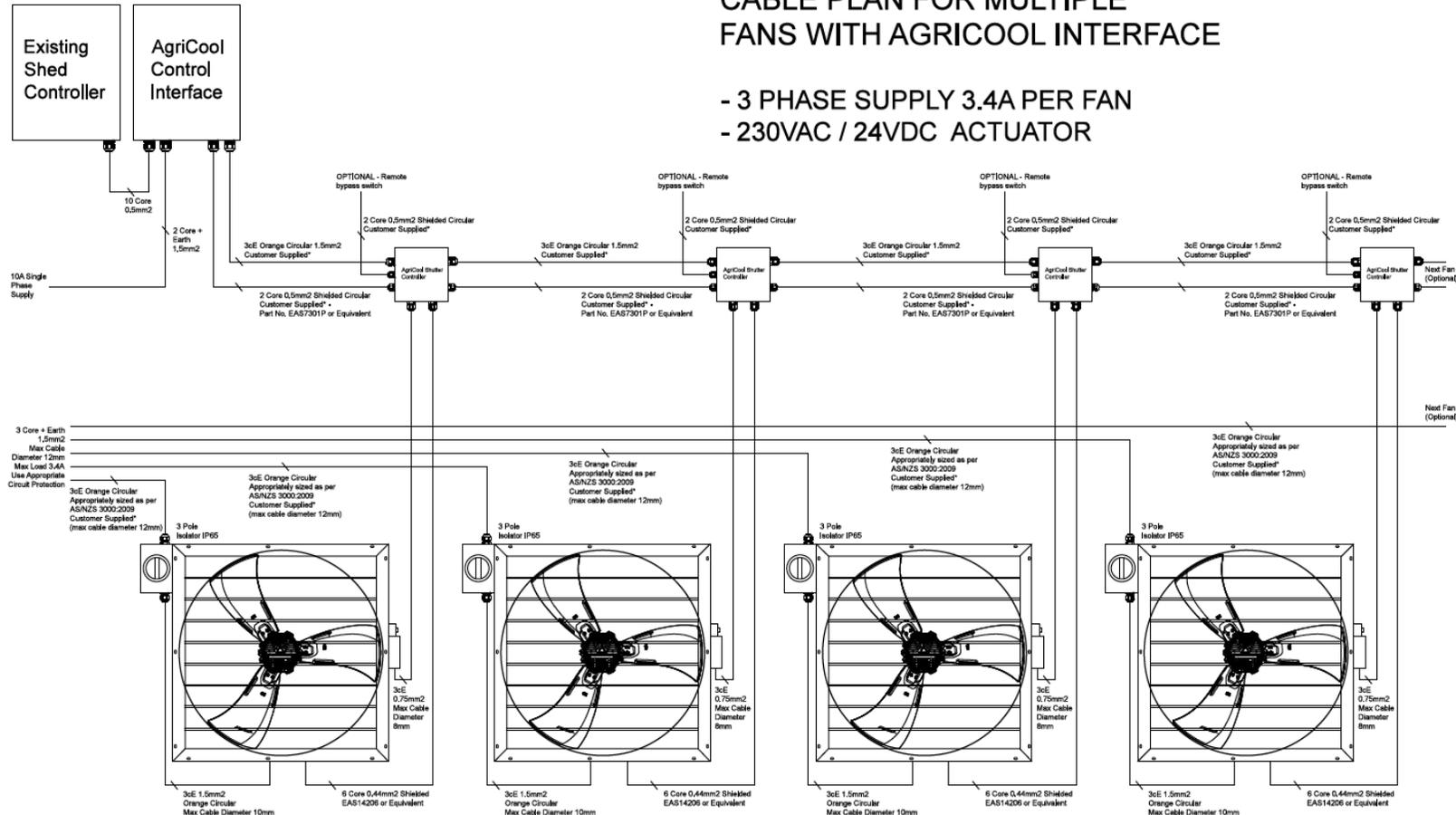


# Operating Instructions

## Appendix D– Standard/Advanced/Premium Cable Plan Multiple Fans with Motorised Shutter

### CABLE PLAN FOR MULTIPLE FANS WITH AGRICOOL INTERFACE

- 3 PHASE SUPPLY 3.4A PER FAN  
- 230VAC / 24VDC ACTUATOR



LAYOUT SHOWN AS EXAMPLE ONLY  
CUSTOMER LAYOUT MAY DIFFER BASED ON INDIVIDUAL REQUIREMENTS OR RESTRICTIONS  
\*PLEASE REFER TO RECOMMENDED PRODUCTS LIST FOR CUSTOMER SUPPLIED ITEMS



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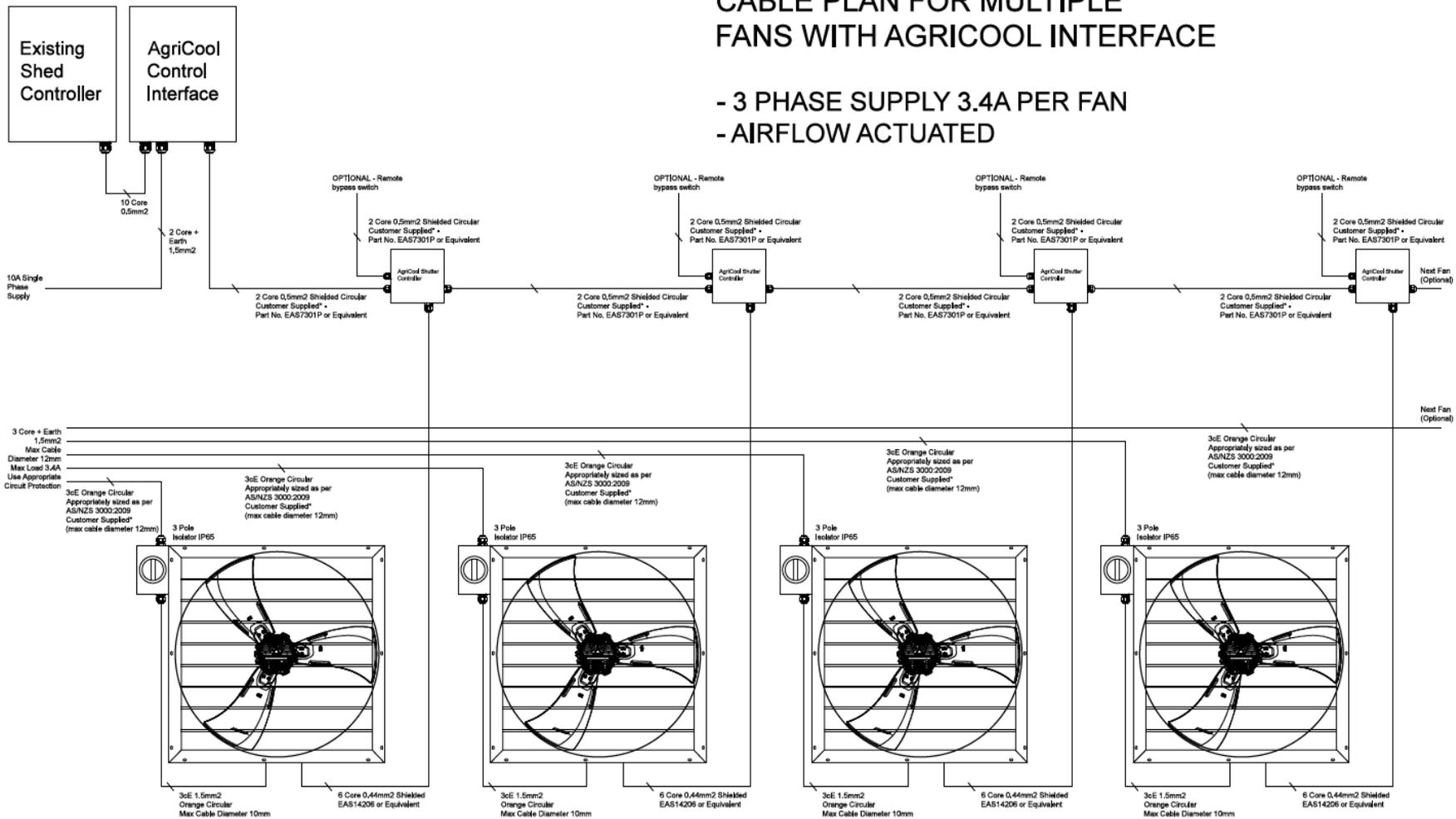


# Operating Instructions

Appendix E – Standard/Advanced/Premium Cable Plan Multiple Fans with Gravity Fed Shutter

## CABLE PLAN FOR MULTIPLE FANS WITH AGRICOOL INTERFACE

- 3 PHASE SUPPLY 3.4A PER FAN  
- AIRFLOW ACTUATED



LAYOUT SHOWN AS EXAMPLE ONLY  
CUSTOMER LAYOUT MAY DIFFER BASED ON INDIVIDUAL REQUIREMENTS OR RESTRICTIONS  
\*PLEASE REFER TO RECOMMENDED PRODUCTS LIST FOR CUSTOMER SUPPLIED ITEMS

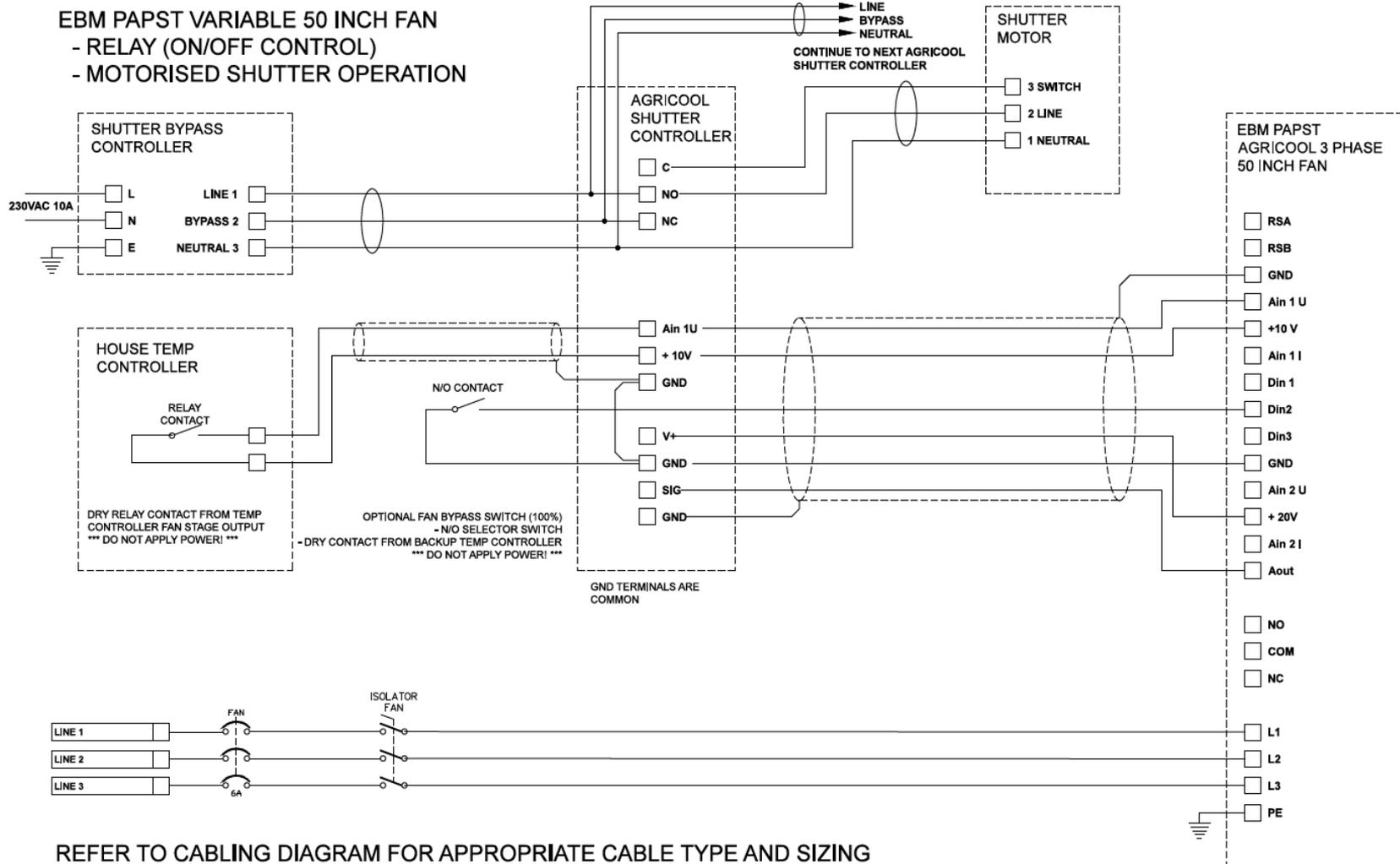


AF1250-003  
AFFB1250-01



# Operating Instructions

## Appendix F – Standard Wiring Diagram with Motorised Shutter





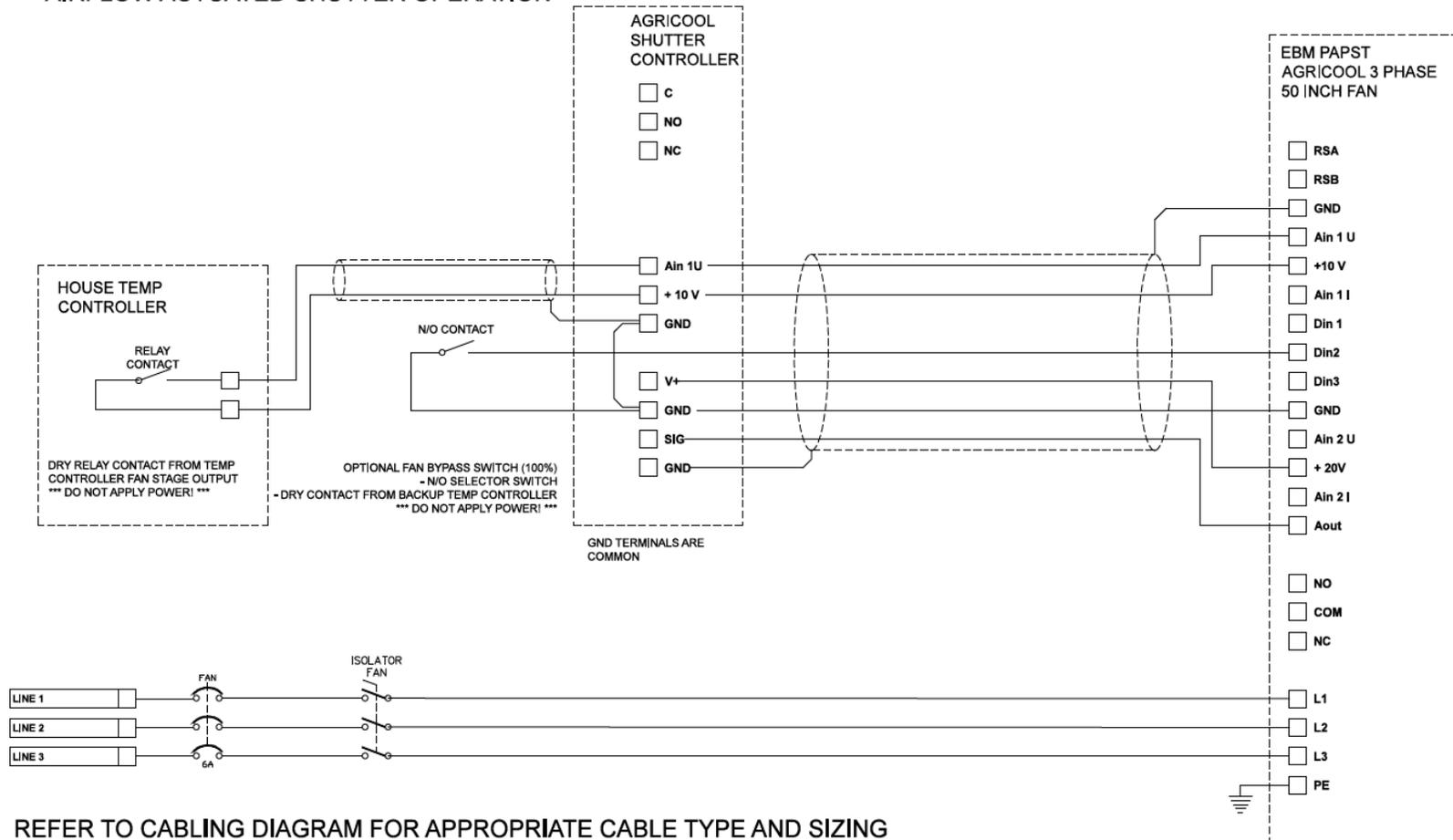
AF1250-003  
AFFB1250-01



# Operating Instructions

Appendix G – Standard Wiring Diagram with Gravity Fed Shutter

EBM PAPST VARIABLE 50 INCH FAN  
- RELAY (ON/OFF CONTROL)  
- AIRFLOW ACTUATED SHUTTER OPERATION



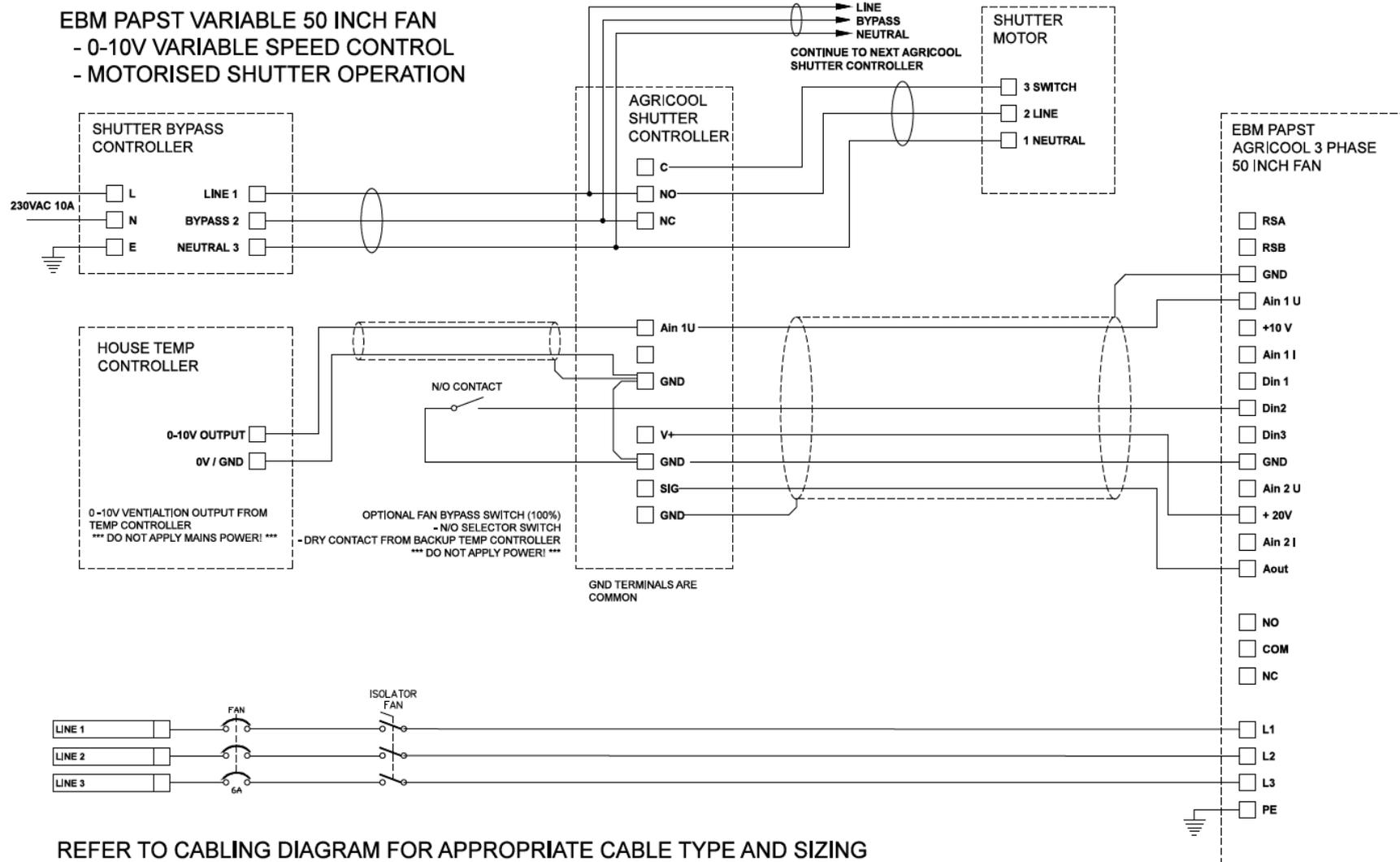


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AFFB1250-01



# Operating Instructions

## Appendix H – Advanced Wiring Diagram with Motorised Shutter



REFER TO CABLING DIAGRAM FOR APPROPRIATE CABLE TYPE AND SIZING  
PLEASE NOTE - FAN REQUIRES CONFIGURATION FOR OPTIONAL BYPASS SWITCH TO BE EFFECTIVE



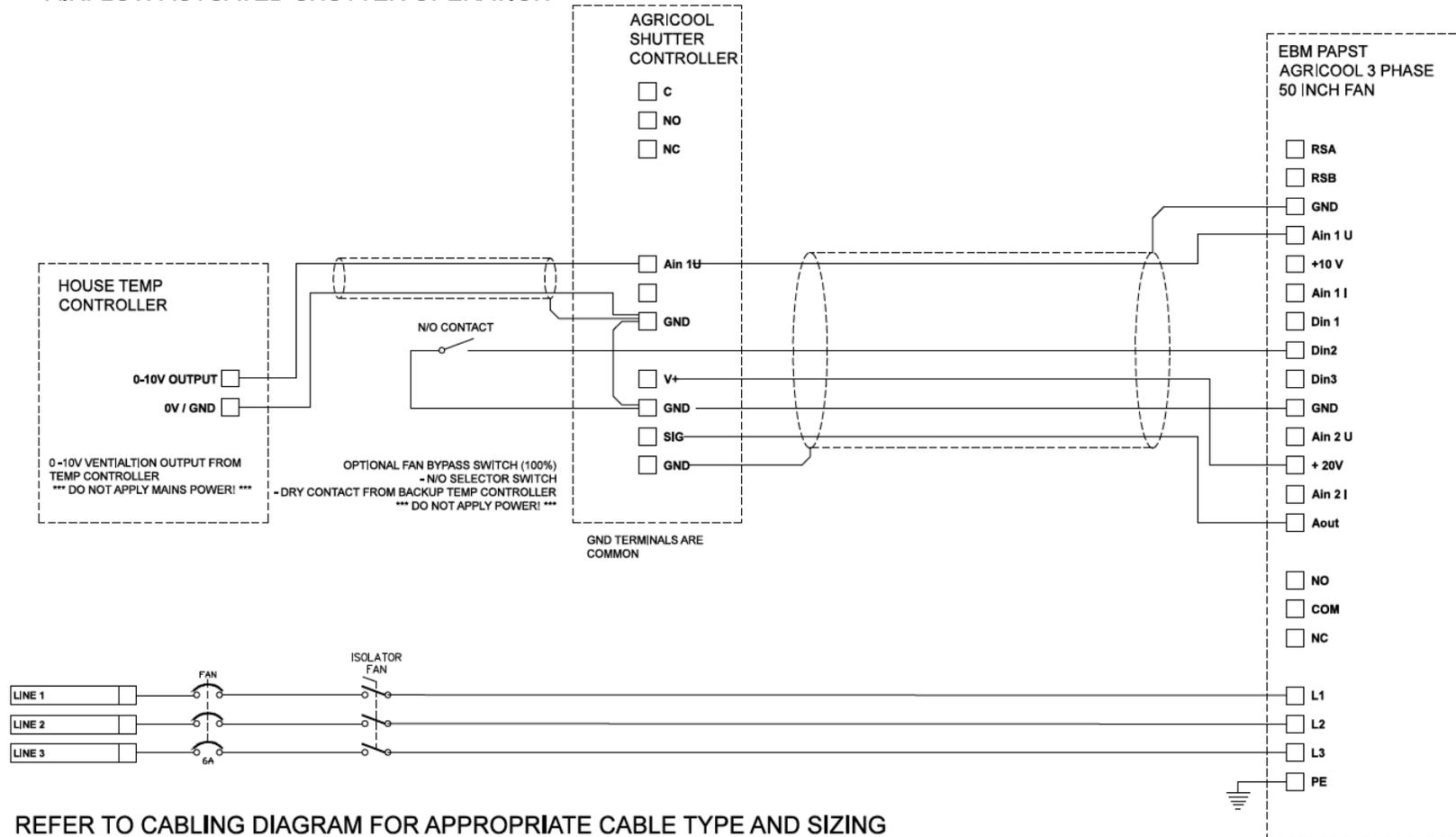
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AFFB1250-01



# Operating Instructions

Appendix I – Advanced Wiring Diagram with Gravity Fed Shutter

EBM PAPST VARIABLE 50 INCH FAN  
- 0-10V VARIABLE SPEED CONTROL  
- AIRFLOW ACTUATED SHUTTER OPERATION



REFER TO CABLING DIAGRAM FOR APPROPRIATE CABLE TYPE AND SIZING  
PLEASE NOTE - FAN REQUIRES CONFIGURATION FOR OPTIONAL BYPASS SWITCH TO BE EFFECTIVE



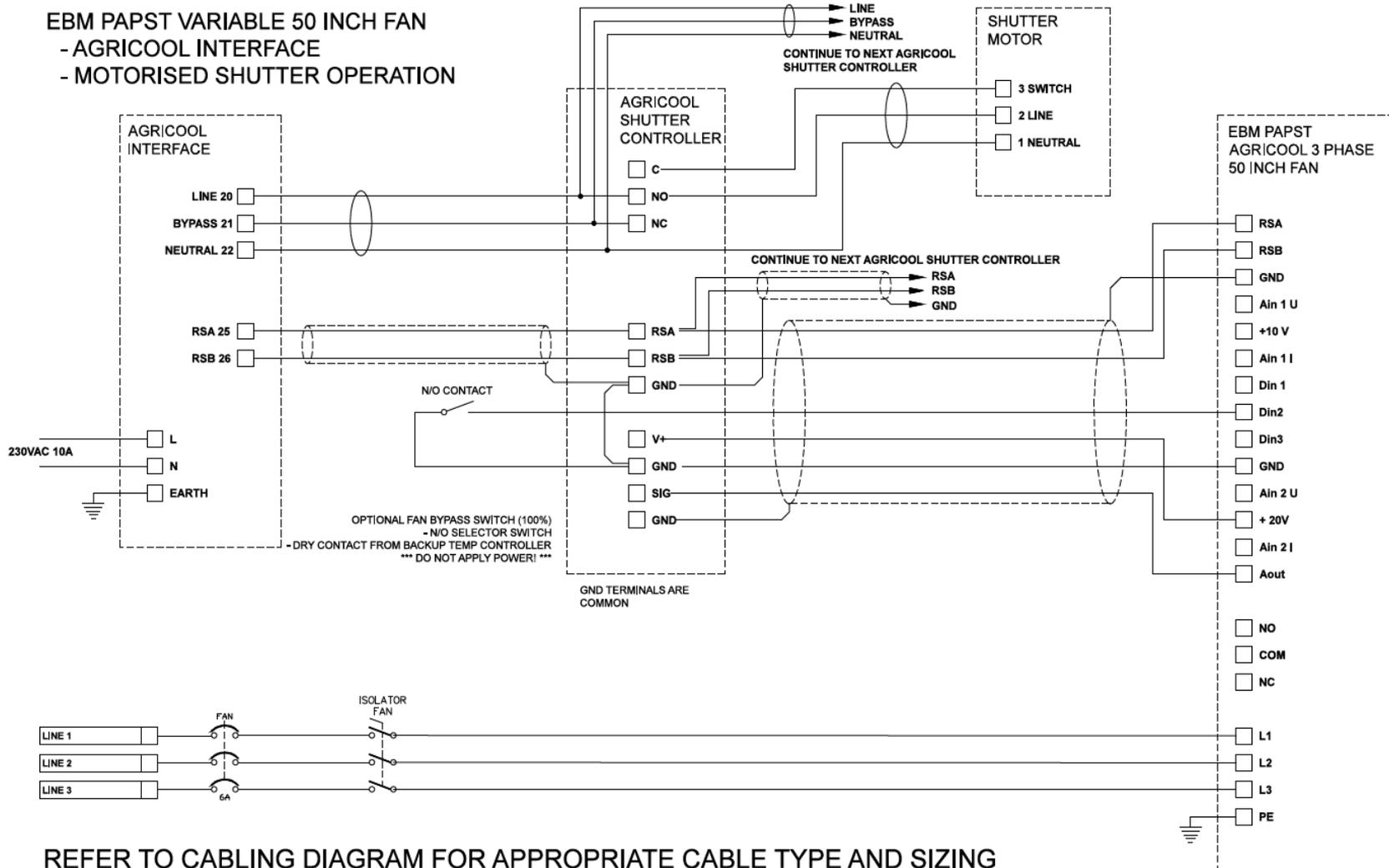
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AFFB1250-01



# Operating Instructions

Appendix J – Premium Wiring Diagram with Motorised Shutter

EBM PAPST VARIABLE 50 INCH FAN  
- AGRICOOOL INTERFACE  
- MOTORISED SHUTTER OPERATION





AF1250-003  
AFFB1250-01



# Operating Instructions

Appendix K – Premium Wiring Diagram with Gravity Fed Shutter

EBM PAPST VARIABLE 50 INCH FAN  
- AGRICOOL INTERFACE  
- AIRFLOW ACTUATED SHUTTER OPERATION

